FACULTY OF ENGINEERING

B.E. (Civil) III – Semester (CBCS) (Backlog) Examination, October 2020

Subject: Electrical Technology (PART A)

Time: 1 Hours   **Max.Marks: 38**

PART – A

Note: Answer any three questions.   **(5x2=10 Marks)**

1   4, one 'ohm' resistors are connected in such a way that equivalent resistance is 'one ohm'. Draw how it can be connected.

2   Given a current of 15 $\lfloor 0°$ and an impedance of (6-j8) of a coil, what is the potential differenence of the coil.

3   Draw the OCC characteristic and mention the maximum voltage built up.

4   What are the losses in a transform?

5   Why the induction motor is called as rotating transformer.

6   Define form factor.

7   Give the instantaneous current i(t) = 2.13 sin (314t + 1.01) through a pure capacitance of 80 microfarads. Find the instantaneous voltage across it.

PART – B

Note: Answer any two questions.   **(2x14=28 Marks)**

8   a)   A two element series circuit consumes 70 w and has a power factor 0.707 leading. If The applied voltage is V(t): 141.1 sin (314t + 30), find the circuit constants.

     b)   Define RMS and Average Values.

9   a)   Show that power consumed by the balanced load can be measured with a two wattmeter method.

     b)   Derive expression for the emf developed by the transformer.

10 a)   Show that when a 3 phase supply is given to a 3 phase winding of a induction motor produce a rotating magnetic field.

     b)   Draw and explain capacitor start and run single induction motor.

11 a)   Explain the open circuit and short circuit tests on a single phase transformer.

     b)   Two impedances Z_1 = (3-J4) and Z_2 = (8 + J6) are in parallel. If the total current is 10A find the power consumed by the each branch.

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FACULTY OF ENGINEERING

B.E. III-Semester (CBCS) (Backlog) Examination, October 2020

Subject : Mechanical Technology (Part-B)

Time : 1 Hours   Max. Marks: 37

Note: Answer any Two questions of Part - A and answer any Two questions from Part-B.

PART – A (2 x 6 = 12 Marks)

1. Explain Revolving Screen?

2. What is a Tower Crane?

3. Write uses of Clam Shell.

4. Explain Hoist Winch

5. Describe Paving Breaker

PART- B (25 Marks)

6. (a) What is the working Principle of Concrete Pump?
   (b) Write about Gyrator and mention its uses.

7. What is the use of Air Compressor? Write its advantages & disadvantanges.

8. (a) State and Explain in detail about a Bull Dozer.
   (b) Differentiate between Swing and Non-Swing mobile crane.

9. (a) Why Vibrating Screen are used in grading of aggregates.
   (b) What are the uses of Fork Lift Truck?

10. Write a note on
    (a) Earth Compactors
    (b) Revolving screen.
    (c) Tractors

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FACULTY OF ENGINEERING

B. E. (EE/Inst.) III – Semester (CBCS)(Backlog) Examination, October 2020

Subject: Electronic Engineering - II

Time: 2 hours   Max. Marks: 70

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**

1. If 3 stages of amplifiers are cascaded together find the overall gain if individual gains are 20
2. State advantages and disadvantages of transformer coupled amplifier.
3. Draw the circuit of basic transresistance amplifier and mention its ideal input and output impedance values.
4. What are the advantages of negative feedback?
5. Find the operating frequency of a Colpitt's oscillator if C1=50 pF, C2=30pF and L=50 mH.
6. State the Barkhaunsen's criterion for sustained oscillations.
7. Differentiate between voltage and power amplifiers.
8. Define class-A, B, AB and C operations of a power amplifier.
9. State the Clamping Theorem.
10. Draw Low pass RC circuit and prove output voltage is integral of input voltages.

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**

11. (a) Determine low frequency analysis of a single stage RC coupled amplifier.
    (b) Find the overall lower and upper 3-dB frequencies of 3 identical amplifier stages connected in cascade. If each stage is having lower cutoff frequency 30Hz and upper cutoff frequency of 30KHz respectively. And also explain the effect on bandwidth.

12. (a) Draw the block diagram of feedback amplifier and explain each block.

    (b) Draw the voltages series feedback amplifier block diagram and derive voltage gain A_{vr}, Input impedance R_{if} and output impedance R_{of}.

13. Draw the RC phase shift oscillator circuit and explain its principle of operation and derive its operating frequency.

14. (a) Draw a transformer coupled class A power amplifier and derive its theoretical efficiency.

    (b) A power transistor operated in class A delivers a maximum of 10W to a 10Ω load with supply voltage of 25V. Calculate

    (i) Peak collector current (I_c) (ii) Efficiency (η).

15. (a) What is the condition a RC high pass circuit to act as differentiator and explain how it behaves for a square wave input.

    (b) Draw positive clamper circuit and explain with input and output waveforms.

16. (a) Explain crossover distortion in complimentary symmetry class B amplifier.

    (b) Draw and explain the double biased clipper also draw the transfer characteristics.

17. Write short notes on the following:
    (a) Frequency Stability in Oscillators.
    (b) Local versus Global feedback.
    (c) Mid frequency analysis of a RC coupled amplifier.

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FACULTY OF ENGINEERING
B.E. III-Semester (CBCS) (ECE) (Backlog) Examination, October 2020

Subject : Elements of Mechanical Engineering

Time : 2 Hours   Max. Marks: 70

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**

1 Define closed system and open system
2 What are the limitations of first law of thermodynamics
3 Define Heat Engine and Heat Pump
4 Compare petrol and diesel engine with respect fuel consumption and power developed
5 State Fourier's law of heat conduction and write the S.I. units of all the terms
6 Differentiate between parallel flow and counter flow heat exchanger.
7 Define opaque body
8 List out the advantages and disadvantages of Gear drives
9 Define slip and how it effects belt drive performance with respect to type of joint
10 List applications of welding and brazing process

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**

11 (a) Derive steady flow energy equation for an open system and list out assumptions made in it.
   (b) 1kg of gaseous CO_2 contained in a closed system undergoes a reversible process at constant pressure. During this process 42KJ of internal energy is decreased. Determine the work done during the process.
   Take C_p=840 J/kg^{o}c and C_v=600 J/kg^{o}c

12 (a) Explain with neat sketches working of two-stroke diesel engine
   (b) Explain the valve timing diagram for 4 stroke CI engine

13 (a) Derive an expression for the LMTD for parallel flow heat exchanger
   (b) An exterior wall of a house may be approximated by a 0.1m layer of common brick (K=0.7 W/m^{o}c) followed by a 0.04m layer of gypsum plaster (k=0.48 W/m^{o}c). What thickness of loosely packed rock wool insulation (K=0.065 W/m^{o}c) should be added to reduce the heat loss or gain through the wall by 80%.

14 (a) Derive an expression for the LMTD for counter flow heat exchanger.
   (b) Derive an expression for length of belt in cross belt drive.

15 (a) Explain the working of a die casting machine with a neat sketch.
   (b) Explain the difference between forward and backward extrusion with neat sketch.

16 (a) Explain different gas flames with neat sketches.
   (b) Explain the working of EDM with neat sketch.

17 Write short notes on the following :
   (a) Reversible and irreversible process
   (b) A Condition for max. power transmission of flat belt drive
   (c) Metal sheet rolling process with neat sketch

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FACULTY OF ENGINEERING

B.E. (M/P/AE) III-Semester (CBCS) (Backlog) Examination, October 2020

Subject : Mechanics of Materials

Time : 2 hours   Max. Marks : 70

PART – A

**Note: Answer any five questions.**   **(5x2 = 10 Marks)**

1   Define Toughness and Hardness.

2   Explain Bulk Modulus.

3   Write down the defination shear force and bending moment.

4   Write the difference between Axial rigidity and flexural rigidity.

5   Mention any three uses of Mohr's circle.

6   Explain Middle third rule.

7   What is the slope and deflection at the free end of a cantilever beam subjected to point load at the free end?

8   Show the basic difference between gradually applied load and impact load.

9   Write the uses of angle of helix and spring index, in helical spring.

10 Draw the torsional stress distribution diagram across circular section of a shaft.

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**

11 In a tension test a bar is found to taper uniformly from (D+a) diameter, to (D-a) diameter, prove that the percentage of error involved using the mean diameter to calculate the Young's modulus is $\dfrac{10\,a^2}{D^2}$.

12 Draw shear force and bending moment diagram.
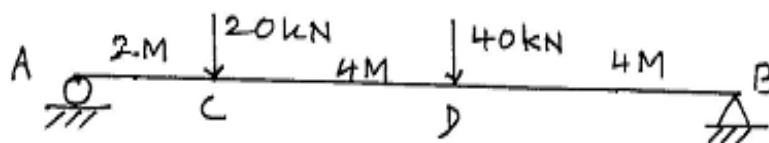
13 A point is subjected to a tensile stress 80 MPa and a compressive stress of 40 MPa acting on two mutually perpendicular planes and shear stress of 20 MPa on these planes. Determine major and minor principal stress as well as man shear stress. Also find the angle made by principal planes with normal cross-section by using Mohr's circle.

14 a) Explain theory of simple bending with example.
   b) A beam of rectangular cross section 200 mm x 300 mm is subjected to shear force of 20 kN. Determine the average shear stress and man shear stress. Also draw the shear stress distribution diagram.

15 A rectangular section in 200mm wide and 150mm thick it carries a load of 150 kN at an eccentricity 12mm in a plane bisecting thickness. Determine maximum and minimum intensities of stress in the section.

16 Find the deflection at 'B' of the given beam interms of E1.
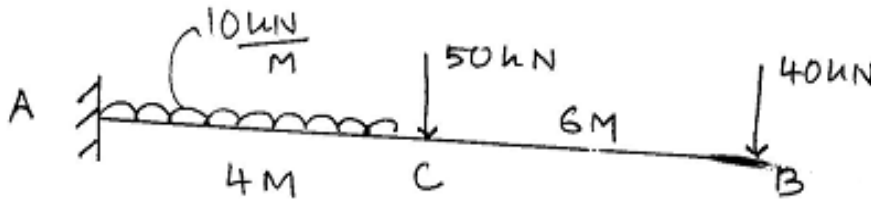
17 Write short notes on the following :
   i)   Power transmission of shaft
   ii) Equivalent torque and equivalent BM
   iii) Bars of uniform strength

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FACULTY OF ENGINEERING

B. E. (CSE) III – Semester (CBCS) (Backlog) Examination, October 2020

Subject: Basic Electronics

Time : 2 hours   Max. Marks : 70

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**

1. Why semiconductors are so important in the manufacture of electronic components?

2. What is a Swinging choke?

3. What is thermal runaway?

4. What are the merits and demerits of BJT?

5. What is the difference between an amplifier and Oscillator?

6. Show the working of BJT as amplifier.

7. Draw the symbol of op-AMP.

8. What are Universal logic gates? Why they are so called?

9. What is temperature transducer?

10. Explain the working of LED.

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**

11. Draw a neat circuit for Full wave rectifier. Derive the Idc, Vdc, Irms, % Regulation, Ripple factor.

12. (a) What are the different regions in which a BJT can be operated?

    (b) What are H-parameters and what is their significance?

13. (a) Draw a neat circuit diagram of the Crystal oscillator and its equivalent circuit. Write the frequencies of oscillation.

    (b) Draw the RC phase shift Oscillator and explain its working.

14. (a) Implement Full adder using suitable logic gates.

    (b) Show the working of Non inverting Op-amp as summer.

15. (a) Draw a neat Block diagram of CRO and explain the purpose of each a block.

    (b) Write a short note on unbounded strain gauge.

16. (a) What is the use of zener diode? Explain.

    (b) What are the different types of breakdown in diode?

17. Write short notes on the following:
    (a) Hall effect.
    (b) JFET.
    (c) Photo transistor.

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FACULTY OF ENGINEERING
B.E III – Semester (CBCS) (I.T) (Supple.) Examination, October 2020

Subject: Probability and Random Processes

Time: 2 hours   Max. Marks: 70

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**

1 State Addition theorem for 3 events.
2 In an experiment of drawing a card from a pack of playing cards, Let A and B be the events of getting a red card and a queen respectively. Show that these events A and B are independent.
3 The probability that a driver will have an accident in one month equals 0.02. Find the probability that in 100 months he will have at least two accidents.
4 A coin is tossed 1000 times, Find the probability of getting 490 heads.
5 Write any two properties of joint distribution function of two random variables.
6 Show that Covariance of two independent random variables is 0.
7 What are the necessary and sufficient conditions for a process to be stationary?
8 Write any two properties of Cross-correlation.
9 Define Poisson process.
10 Write any two properties of Power Spectral density of a stationary process.

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**

11. (a) Two players A and B draw balls one at a time alternatively from a box containing m white balls and n black balls. Suppose the player who picks the first white ball wins the game, what is the probability that the player who starts the game will win?
    (b) Explain about conditional probability.

12. (a) The Probability Density Function (pdf) of a continuous random variable X is given by $f(x) = kx(2-x)$, $0< x < 2$. Find
    i) k   ii) Mean   iii) Variance

    (b) For a Poisson random variable $P(X = 2) = 2.P(X= 0)$, Find
    i) Mean   ii) $P(2 < X < 6)$ iii) $P(X > 2)$

13. Determine the following if $f(x, y) = \{ k ; 0< x < y < 1$
                                 $= \{ 0;$ otherwise
    i) k   ii) f (x/y)   iii) f (y/x)   iv) E [Y/X]

14. If $X(t) = 5\cos(10t + \theta)$ & $Y(t) = 20\sin(10t + \theta)$ where θ is a uniformly distributed random variable in $(0, 2\pi)$. Prove that X(t) & Y(t) are jointly stationary in wide sense WSS.

15. (a) For a random process having Autocorrelation $R_{xx}(\tau) = a. e^{-b|\tau|}$. Find Power spectral density.
    (b) Find auto-correlation function of a WSS process if its power spectral density (PSD) is given by
    $S_{xx}(w) = \{ b / a (a - |w|)$; $|w| <= a$
              $\{ 0$; $|w| > a$

..2

16. (a) A speaks truth in 65% of cases and B speaks truth in 85% of cases. Find the probability that they contradict each other while speaking the same incident.
    (b) Over a period of 12 hours, 180 calls are made at random. What is the probability that in a two hour interval the number of calls is between 50 and 70?

17. (a) If X, Y are two independent exponential random variables with common parameter 3. Find joint and marginal pdf 's of U and V such that U = X + Y and V = X – Y
    (b) If particles are emitted from a radioactive source at the rate of 20 per hour according to Poisson process. Find the probability that in a 15 minute interval, the number of emitted particles is
    i) Exactly five
    ii) At least two

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